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## **Do All Parties Die “The Same”? Using Hierarchical Competing Risks Models for Cross-National Research on Party Mortality**

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## Abstract

This case study highlights the advantages and challenges of using hierarchical competing risks models to analyze the determinants of party mortality from a comparative perspective. I review how these models can be used to simultaneously examine the impact of electoral, political, and institutional factors on two distinct but potentially correlated forms of party death, dissolution, and merger, while controlling for other observed and unobserved characteristics of the parties and of the democracies in which these operate. I illustrate the workings of this model by examining a data set covering the complete life cycles of 184 new parties that entered 21 consolidated democracies between 1968 and 2016. A key issue with hierarchical competing risks models is that standard statistical techniques and software packages for survival analysis either impose the assumption that the hazards (probabilities or risks) of both types of death are independent, or only model their dependence at the party or country level (but not both). Overcoming these limitations was the most important technical challenge faced during the project. In addition, over the course of the investigation, the members of the research team had to make several important methodological choices, such as how to select the parties to be included in the analysis, how to operationalize the different types of death, and how to deal with potential collinearity between the explanatory variables. I discuss how these challenges were handled in practice, and draw some lessons for researchers interested in party mortality and survival analysis more generally.

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## Learning Outcomes

By the end of this case study, students should be able to

- Understand the advantages and difficulties of using hierarchical competing risks models for longitudinal cross-national research on organizational mortality
  - Recognize that parties may cease to exist through different mechanisms, and understand why it is important to distinguish between the distinct types of organizational mortality from a methodological and substantive standpoint
  - Realize that although dissolutions and mergers are two separate forms of death, they may be correlated or even strategically interrelated
  - Comprehend the importance of controlling for life cycle dependence when studying the determinants of party mortality
  - Understand that the hazard of party mortality is influenced by both organization- and country- (or democracy-) specific factors, and that it is therefore crucial to account for the multilevel structure of the data when studying party mortality from a cross-national perspective
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## Using Hierarchical Competing Risks Models to Study Party Mortality

## From a Comparative Perspective

Survival analysis—also known as duration or event-history analysis—has been increasingly used in political science to address relevant questions about the duration and timing of political events and, more generally, about the patterns and causes of political change. Why are some governments more stable than others? Why do some military conflicts end quite rapidly, while others seem to drag on forever? What leads politicians to step down from public office? What are the factors behind the demise of political parties? Although substantively different, all these questions are ultimately concerned with the reasons explaining why political phenomena or processes endure or not. Given the ubiquity of this kind of questions, duration models are—in the words of Golub (2008)—“poised to become one of the most dominant quantitative methodologies in political science.”

Most applications of survival analysis in the discipline focus on the simplest case in which there is only “one way” in which political process may be brought to an end—for example, military conflicts finish when some sort of peace agreement is brokered, public officials step down after failing to be reelected, parties dissolve because of their poor electoral performance or prospects. In many instances, though, a spell could potentially terminate via multiple mutually exclusive “modes of exit.” For instance, a government may end after losing an election but also due to a vote of no confidence or through a reshuffling of ministers, among several other possible terminal events. A member of Congress may retire, fail to be reelected, be forced to resign after a scandal, or simply decide to run for a different office. And, closer to the focus of the research described in this case study, a party may cease to exist because it is dissolved by its leadership, because it is absorbed by another party, or through a merger with another formation. While some explanatory factors may affect the likelihood of all forms of exit, others may be mode-specific, and thus accounting for these differences contributes to gain a better understanding of how political processes or phenomena “die.”

Competing risks models are specifically designed to account for the fact that political processes can end in a number of distinct ways, allowing the researcher to assess the impact of relevant explanatory factors on the relative probability of occurrence of each of the possible terminal events and providing a more detailed account of when and why these processes end. Although competing risks models are widely applied in biostatistics and medical research (e.g., to examine the relative prevalence of different sources of mortality and quantify their respective drivers), their use in the social sciences has been rather limited so far.

Moreover, the vast majority of political science applications of competing risks models assume that the hazards of the various terminal events are stochastically independent. This is a very restrictive assumption, analogous to the independence of irrelevant alternatives (IIA) in discrete choice models. Even when the competing risks represent mutually exclusive episodes, some characteristics of the political processes or phenomena under study may jointly affect the likelihood of all these terminal events. For instance, poor election results may raise the probability that party elites consider dissolving their organization while prompting these elites to seek opportunities for mergers to improve their organization’s electoral fortunes.

The independence assumption is even less reasonable when dealing with multilevel or hierarchical data where various individual actors (e.g., parties) are observed within a common political environment. In such circumstances, contextual factors—for example, the politico-institutional features of the democracies in which the parties operate—can concomitantly affect the probability of occurrence of different terminal events as well—either in the same or in opposite directions. A priori imposing the assumption of independent risks can lead to biased parameter estimates and erroneous inferences regarding the specific causes explaining the survival or endurance of political parties—or of any other political actor, institution or phenomenon, for that matter.

In the present case study, I illustrate the advantages but also the main difficulties faced in the application of hierarchical competing risks models to the analysis of party mortality in established democracies, describing the methodological choices that had to be made to overcome such difficulties and summarizing the most important lessons learned during this process. In doing so, I also consider other, more general empirical dilemmas commonly faced by scholars analyzing organizational mortality, and discuss the way in which such problems were addressed in practice.

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## **Project Overview: Studying the Determinants of Party Mortality in Established Democracies, 1968–2016**

From a substantive perspective, the main goal of the project featured in this case study, co-authored with Professor Nicole Bolleyer and Dr. Patricia Correa from the University of Exeter, was to examine the determinants of party mortality in established democracies over the last half century, distinguishing between two fundamental types of party death: dissolution and merger.

Scholars studying political parties have paid relatively little attention to fundamental questions about party mortality and their determinants in established party systems. A possible explanation for this lack of interest is that consolidated party systems are usually considered “frozen” because, as noted by Mack (2010), the demise of the core organizations constitutive of such systems has been extremely rare. This, however, does not hold for new parties entering the electoral arena after these party systems have already consolidated. For these new entrants, death is in fact a relatively common occurrence: Roughly 40% of the political formations entering the national party systems considered in this case study since 1968 had died by 2016. Furthermore, not all these novel parties died in the same way: Two thirds of them were dissolved by its members or leadership, while the remaining 33% merged with other organizations to form a new political entity.

A core point made by Bolleyer, Correa, and I is that dissolution and merger represent different types or forms of party mortality that reflect separate behavioral logics underpinned by distinctive motivations. Dissolution is a predominantly reactive form of organizational death, resulting from the unwillingness of party followers and elites to stick with their organization as the party proves unable to achieve its basic electoral and/or political goals. Merger death, in contrast, reflects a deliberate attempt of party elites to improve the party's position

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within a given opportunity structure: These elites are willing to give up their party's autonomy to improve the chances of achieving fundamental goals that the party cannot attain by itself. Hence, merger death is a state that is actively chosen by elites, while dissolution is a state to be prevented.

If dissolution and merger are indeed distinct types of death, they should be determined—at least in part—by different factors. To the extent that dissolution is a response to resource shortages undermining party maintenance, it should be affected by political, institutional, or financial factors that condition the party's access to resources and render it fundamentally vulnerable and/or unable to compete in elections for public office. Hence, factors like parties' recent electoral performance, which affects their institutional access to tangible rewards (e.g., seats in parliament); the availability of direct—campaign and organizational—state funding allowing parties to sustain their basic functions; and the existence of supra- or sub-national tiers of government (e.g., the European Parliament, regional governments) that provide parties with opportunities to win seats, gain political visibility, and access additional resources beyond those available in the national political scenario are all likely determinants of the risk of dissolution.

By contrast, if merger death is the result of a proactive decision made by elites to improve their party's ability to achieve political and electoral goals, it should be shaped by factors influencing elites' strategic calculus and the overall costs and benefits of giving up the party's autonomy. In particular, by factors determining (1) whether a merger is likely to generate enough benefits for the party, vis-à-vis its costs, and (2) whether competing as a separate player remains an attractive and viable alternative or not. The degrees of fragmentation and polarization of the party system a political organization operates in, which affect its chances of finding a suitable coalition partner and/or of becoming a relevant player in coalition negotiations—which in turn impinges on the party's chances of achieving government positions—should therefore be critical drivers of the risk of merger death.

Nonetheless, and consistent with the arguments outlined in the introductory section, the fact that dissolution and merger are distinct types of death influenced by partially different rationales does not necessarily mean that they are independent. On one hand, some characteristics of the parties themselves or of the democracies in which they operate may affect organizations' vulnerabilities and strategic considerations alike, simultaneously shaping the risks of both types of death. For instance, parties backed up by promoter organizations—for example, social movements, trade associations, and environmental groups—already established in society may be less likely to dissolve, as this external support may provide political formations with access to important resources (as well as with a pool of committed activists who may be reluctant to let the party die). Such linkages to external actors may also discourage parties from compromising their unique identity and constrain elites' ability to negotiate and establish mergers with other formations.

What is more, the risk of one type of death could directly affect the other. For example, members concerned about their party's survival may opt for a merger precisely as a step to avoid dissolution, and elites might carefully weigh the pros and cons of a tactical merger and its likely success before deciding to disband the organization. Hence, the hazards of both types of death may not only be shaped by some common factors but might even be strategically linked. As noted before, such interdependence between the different forms of

party mortality must be explicitly accounted for in any empirical analysis.

In sum, our research sought to explore the factors explaining the relatively common occurrence of mergers and dissolutions among new entrants in established party system, and to assess whether and to what extent these two predominant types of death respond to the same or different causes. This required a meticulous definition of the criteria to be followed to identify and select the “new parties” in established democracies; a careful coding and operationalization of the notion of party mortality and of the distinct types of death; and the implementation of an empirical approach capable of discriminating between these different types of death and their determinants while accounting for their potential interrelation. The fact that virtually no prior study had sought to systematically distinguish different forms of party death and estimate their differential causes already suggested that the methodological challenges posed by this enterprise could be quite daunting.

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## Research Design: Data and Measurement Issues

To be able to examine the determinants of party mortality in established democracies, we built a novel panel data set covering the complete life cycles—from their organizational birth until their potential death—of 184 parties that entered 21 fully consolidated party systems in Western and Southern Europe, North America, and Australasia between 1968 and 2016. In putting together this new data set, the research team had to consider various definitional and measurement aspects and to take several decisions along these dimensions.

To begin with, what does it mean for a party system to be consolidated? The literature on party system institutionalization is extremely vast, and different authors follow different guidelines to determine whether a system is fully consolidated or not. For the purposes of this investigation, the members of the research team used a period of 20 years after transition to democracy as a minimum threshold: A party system was considered established only after two decades or more had elapsed since the country had returned to democracy. In the case of countries that remained democratic throughout the second half of the 20th century, we took the year 1968 as the starting point for our analysis, in line with the arguments in Bornschier (2009) that these long-standing party systems began to “de-align” in the latter part of the 1960s. These criteria ensured that the party systems under study were institutionalized, stable government alternatives could form, and each democracy in our sample experienced alternation in government. This was crucial to allow for a meaningful test of our argument that having potentially attractive coalition partners and a realistic chance of accessing government were important determinants of the risk of merger death, as these factors are unlikely to play a role for elites’ strategic consideration of mergers in dominant party systems without viable government alternatives.

Focusing on durable and consolidated party systems also allowed us to gather data on full party life cycles of up to almost five decades, a long enough period to examine the dynamics and timing of party mortality in great detail. In addition, it ensured that the “rules of the game” were exogenous to the new parties that were the focus of our study, which cannot be assumed at the beginning of a party system’s life or with regard to parties that were actually involved in designing newly democratic systems. However, concentrating on established

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party systems admittedly limited the generalizability of our conclusions: While we could be confident in the validity of our results for the subset of consolidated—or, almost equivalently, industrialized—democracies, it would be a stretch to extrapolate these findings to other settings—for example, Latin American democracies, Central and Eastern European countries.

A second critical definitional issue we faced referred to the classification of “new” parties. We considered as “new parties” those that entered electoral contests after the consolidation of their party systems, and that were built from scratch, formed by minor splits from established parties, or jointly built by old and new formations. Ideally, we would have liked to cover all such new parties in our empirical analysis, provided they had participated in elections at least once between 1968 and 2016. However, collecting information on all these organizations over the course of almost 50 years turned out to be essentially impossible—at least with the degree of detail required to thoroughly examine the determinants of dissolution and merger death. We thus faced an inevitable trade-off between the desire to minimize potential selection biases and the need to gather fine-grained data on parties’ life cycle events.

In the end, data limitations played an important role in determining the characteristics of our sample, as is (almost) always the case in any empirical study. To render our analysis “manageable,” we decided in principle to center on those new parties that had won seats in national parliament at least once in their lifetime, irrespective of their vote. However, because electoral thresholds—that is, the minimum share of the vote required to achieve parliamentary representation—are rather high in some democracies (like Germany), adopting this selection criterion would have restricted the analysis only to relatively popular new parties—at least in these countries. Hence, to enhance the cross-national comparability of our sample parties, we also included those new formations that never reached parliament but obtained a minimum of 2% of the national vote at least once in their life span.

Still, one concern of using this—albeit expanded—selection criterion is that very marginal or minor formations may be underrepresented in our study. Nonetheless, we were reassured in our decision by the fact that the composition of the sample probably biased the data against our hypotheses. More precisely, because marginal parties are typically less able to access some of the resources expected to boost organizational resilience (e.g., state funding), excluding these very minor formations from the sample meant that our empirical analysis would—if anything—underestimate the influence on mortality of one of our key explanatory variables. Consequently, even if our definitions and selection criteria were not optimal, our findings would likely be conservative: For our theoretical arguments to be validated by the empirical analysis, the evidence would have to meet quite stringent statistical criteria. This could at least help us safeguard the “integrity” of our conclusions in light of the data constraints we faced.

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## Operationalizing Party Death

Another important measurement decision involved the operationalization of the dependent variable(s). When can we consider a party as “dead”? How to clearly distinguish between dissolution and merger death for the

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purposes of statistical analysis? And how could we consistently code these three variables and make them comparable, both across countries and over time?

According to Sartori (1976), participating in elections by nominating candidates for public office is a key defining trait of political parties, one that sets them apart from organizations such as interest groups or social movements. It thus seemed reasonable to classify a party as dead once it no longer fielded candidates in electoral contests. This coding rule, however, left some room for ambiguity. For instance, parties may not nominate candidates themselves but still participate in elections through electoral alliances. Similarly, a party can temporarily withdraw from the electoral arena, refraining from participating in an election—or in a few elections—but eventually competing again. Therefore, to unequivocally discriminate between parties that effectively ceased to exist and those that joined transitory electoral alliances or that “hibernated” during a few election cycles, we defined a party as dead when it permanently ceased to nominate candidates for any electoral contest as a separate and autonomous organization.

The operationalization of the two specific forms of party mortality considered in the study, in turn, required a meticulous, case-by-case scrutiny of the conditions under which each organization included in our sample ended its participation in electoral politics. Parties that were formally disbanded through a membership meeting or by a declaration of the leadership, that perpetually withdrew from elections (e.g., re-shifting their focus toward societal or lobbying activities), or that were fully absorbed by another formation, were coded as dissolved. To operationalize merger death, we used the change in the merged party’s name as the defining criterion, as previous research has shown that the name question is usually a central issue in merger negotiations. We considered as mergers—rather than as absorptions—only cases in which the name of the new entity arising from a merger differed from that of any of its constituent members. This distinction between a merger and an absorption, however, is somewhat subtle and can in fact be quite tricky. The guiding principle we used in our research is that, in an absorption, a party ceases to exist as a separate organization without being in a position to negotiate an agreement on how and what type of new organization to form. In a merger process, in contrast, each participant—not just one of them—gives up its organizational identity. The name of a party, we argued, is a core component of its identity, and the willingness to give up its own name as part of a merger process (or not) has been shown to more accurately capture the relative strength of each merger partner than measures based on membership size or vote share.

Of course, we could have used slightly different definitions of party death, dissolution, and merger, and each of these alternative operationalizations could in principle have led to diverse conclusions—different also from those drawn from our empirical analysis. Therefore, we thoroughly justified and documented all the coding choices in our research, carefully describing their rationale, the data sources, and the procedures followed to measure each of these variables. The data set and codes have also been made publicly available (see the “Web Resources” section), so that any researcher interested in revisiting our findings and assessing their robustness can try other ways of operationalizing party death and rerun the statistical analysis. Ultimately, debates and disagreements about the definition and coding of relevant variables are inevitable in empirical work, and scholarly exchanges about these issues are an intrinsic part of academic practice. Hopefully, such



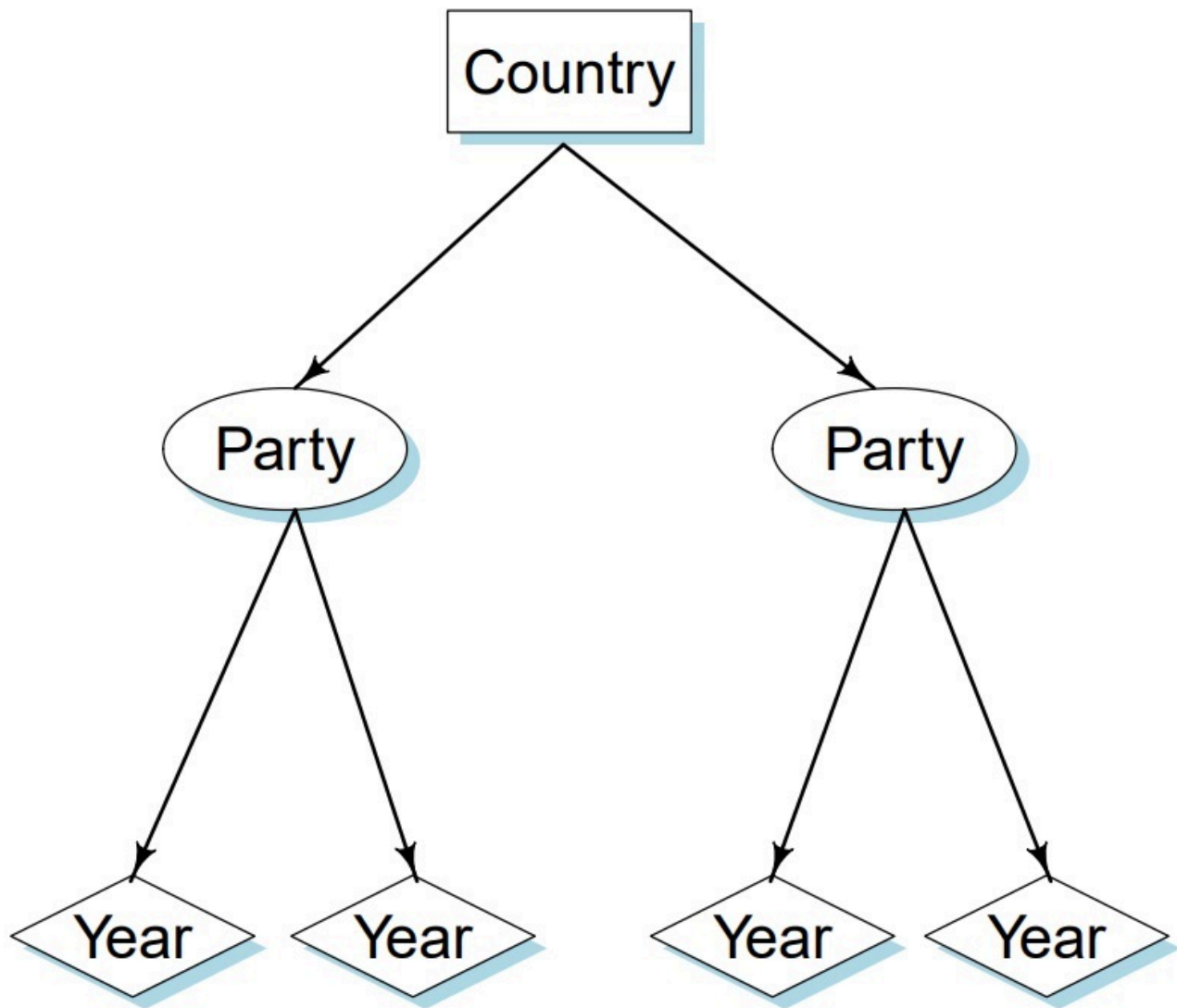
exchanges can contribute to refine and advance our understanding of the drivers of party mortality. The research covered in this case study is simply a first step in this direction.

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## **Hierarchical Competing Risks Models in Action: Challenges and “Solutions”**

Having decided on the operationalization of the variables of interest, it was time to move to the empirical analysis. Based on the definitions adopted for each type of death, we found that 71 of the 184 new parties in the sample died between 1968 and 2016: 47 of them dissolved while 24 merged over this period. Both types of death were significantly more likely to occur while the parties were still relatively young, underscoring the need to account for negative duration dependence—that is, for the fact that the likelihood of death decreases over time—in our empirical analysis. Moreover, the timing and frequency of the two types of death varied substantially within and between democracies. This suggested that not only party-specific factors—like their electoral performance—but also characteristics of the democracies in which these parties operated—for example, the rules guiding the allocation of state campaign financing, the nature of the party system—were relevant for explaining the hazard probabilities of dissolution and merger death. In other words, this highlighted the importance of accounting for the multilevel structure of our data. Specifically, our data exhibited a three-level hierarchy, with yearly observations for parties, and each party nested within one of the 21 democracies under study (see [Figure 1](#)).

**Figure 1. Hierarchical structure of the data on party mortality.**



Thus, a hierarchical or multilevel competing risks model was particularly well suited for our analysis. However, the application of this modeling approach to the data at hand required making some additional technical or methodological decisions.

First, dissolutions and mergers are continuous processes—that is, party mergers and dissolutions can take place at any given point in time. However, organizational deaths in our data set were recorded to the nearest year. Hence, the statistical analysis needed to reflect these relatively coarse measurement intervals, rather than assume that the durations were accurately measured. Moreover, because of these yearly measurement intervals, several parties could experience a terminal event—merger or dissolution—at exactly the same point in our data set. Even when continuous time survival models might be more “realistic” (or, to be more precise, may be better able to capture the continuous nature of the underlying processes of interest), they can

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yield severely biased estimates in circumstances in which there are a large number of such “ties.” For these reasons, I opted for a discrete-time competing risks model, which also allowed for a more straightforward way of incorporating time-varying covariates (e.g., election results) into the model specification vis-à-vis continuous time models.

Second, the covariates included in our data set were in all likelihood unable to reflect all the potentially relevant party- and country-specific factors affecting organizational mortality. To control for unobserved or unmeasured sources of heterogeneity beyond those captured by our explanatory and control variables, I decided to incorporate bivariate party- and country-specific random effects into the specification of the competing risks model. These bivariate frailties would also allow accounting for any possible correlation between the two types of death, both at the party level and the country level. However, including random effects posed an additional methodological difficulty, as virtually all the canned estimation routines for competing risks models available in commonly used statistical software packages—such as SPSS<sup>®</sup>, Stata<sup>®</sup>, or R—can handle random terms at a single (either party- or country-) level only. In addition, fitting a model with two bivariate random effects is computationally cumbersome: The estimation procedure requires integrating over the distribution of each of the random terms, and standard numerical techniques used for this purpose (such as the Gauss–Hermite quadrature) are prone to instability problems.

Hence, I resorted to Bayesian inferential methods and estimated the model through Markov chain Monte Carlo (MCMC) simulations, which provide a useful and efficient way of handling complicated integrals while avoiding the pitfalls of numerical methods. The Bayesian framework also had another important advantage in the context of our application, as many of the explanatory variables posited to influence dissolution and/or merger death could be expected to be closely correlated. For example, a party’s electoral performance might be highly collinear with its access to direct state campaign funding. This raised concerns about possible multicollinearity in our analysis. It is well known, though, that the combination of prior and sample information in the Bayesian estimation paradigm can help mitigate multicollinearity, which thus becomes less of a problem than under frequentist inferential methods.

I decided to code the MCMC algorithm myself in R. This was arguably the most arduous—and probably the least fun—part of the project, as it required me to derive the mathematical formulae (e.g., the posterior distributions of the model’s parameters) behind the MCMC algorithm, to translate these formulae into software code, and to run and debug the code multiple times. At the same time, spending time and effort coding the MCMC algorithm allowed me to acquire a better understanding of and more control over the estimation process than I would have obtained using “black box” routines. The R program used to produce the results reported in the published version of the paper has been made publicly available (along with replication instructions) and can be found following the link included in the “Web Resources” section. It is worth noting, though, that the model could have also been fitted using freely available Bayesian statistical packages like BUGS, JAGS, or the more recently developed (and faster) Stan<sup>®</sup> platform (see the “Web Resources” for links to these packages). This is in fact the strategy used by Gordon (2002) in one of the few other applications of multilevel competing risks models in political science—although Gordon’s model accommodates only two

(rather than three) levels in the hierarchy, and thus includes fewer random effects.

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## A Summary of the Empirical Findings

A detailed account of the findings presented in the published article emerging from the project is not the focus of this case study. That said, it is worth mentioning that the results confirmed the central arguments that led to this investigation. Our analysis uncovers systematic differences between the determinants of and mechanisms underlying dissolution and merger death. While dissolution is primarily associated with factors affecting parties' vulnerability and access to resources, as expected, merger death is mainly affected by variables shaping organizations' strategic position in the political and party system. Only some origin or formative features characterizing parties at the time of their birth—for example, whether they were founded with the support of preexisting societal organizations—influence both forms of mortality. Moreover, we did not find evidence that unmeasured traits of the parties or polities under study simultaneously drive both forms of mortality, or that dissolution and merger death are strategically linked. The residual correlation between the hazards of merger and dissolution is statistically indistinguishable from zero, and there are no significant direct effects from one type of death to the other.

These results thus reinforce the notion that dissolution and merger death are not intrinsically related, although—importantly—this conclusion stems from a rigorous statistical analysis and not from arbitrary assumptions imposed a priori. Altogether, our findings underline the importance of distinguishing between the two varieties of party mortality and their determinants, both from an analytical and a methodological perspective.

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## Conclusion

Hierarchical competing risks models enable researchers interested in the causes and timing of political processes to jointly examine various alternative ways in which such processes may come to an end, to estimate the impact of individual and contextual variables on the relative risks of these different modes of exit, and to assess their potential correlation and strategic interdependence. Although competing risks models have seen a rather limited use in political science and international relations, there are several promising applications for which they might be useful, such as the analysis of the causes of cabinet survival and failure, the study of the duration of international crises and its determinants, or the examination of the evolution and drivers of political careers.

A key issue to consider when applying this model is that the competing risks must be precisely conceptualized and operationalized. Researchers should also carefully think about whether these competing risks are expected to be correlated or not. In general, when there is no clear theory suggesting that the hazard probabilities of the terminal events are correlated—or when the analytical framework explicitly postulates independent hazards—it may be worth fitting a simpler version of the model that side-steps the computational

difficulties associated with the inclusion of multivariate random effects. This simpler version of the model can be easily estimated using conventional software packages. However, the independence assumption is unlikely to be appropriate for many political science applications, and imposing—rather than testing—it may lead to erroneous substantive conclusions about the drivers of the phenomenon of interest.

A fundamental challenge posed by the estimation of more complex hierarchical competing risks models is that off-the-shelf routines included in commonly used statistical programs do not provide researchers with the flexibility or computational efficiency they may need, especially when the application requires more than one set of frailties or random effects. Hence, the estimation procedure may have to be tailored to the specific data set and problem at hand. While developing and coding one's own estimation algorithms may seem daunting for most political scientists and students of politics, the growing popularity of freely available software for Bayesian analysis—such as BUGS, JAGS, or Stan<sup>®</sup>—significantly lowers the barriers to fitting multilevel competing risks models.

Hopefully, quantitatively oriented students and early career researchers interested in the causes and sources of party mortality, and those using duration models more generally, can take the lessons and suggestions presented in this case study as useful starting points when thinking about their own work. Additional resources that can help readers gain a more detailed knowledge of competing risks models and their estimation are listed in the “Further Reading” section.

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## Exercises and Discussion Questions

1. This case study argued that dissolution and merger are distinct types of party death, and that it is important to disentangle their drivers while accounting for their potential correlation. What would be the downsides of lumping the two types of death together when examining the determinants of party mortality?
2. Can you think of other types of party death—besides dissolution and merger—that could also be incorporated into the analysis? How would this addition affect the specification of the competing risks model?
3. I argued above that controlling for negative duration and life cycle effects is important when attempting to estimate the drivers of party mortality. What are the potential drawbacks of failing to do so?
4. As noted in the concluding section, one could estimate a simpler version of the competing risks model, one that does not include (party- or country-specific) random effects. What would be the concerns of drawing conclusions from such a “single-level” model in the application illustrated in this case study?
5. The research featured in this case study focused on the mortality of new parties in established party systems. What changes—if any—would need to be introduced in the empirical analysis if one were to include also other (e.g., non-consolidated or developing) democracies in the

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## Further Reading

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## Web Resources

A Practical Guide on Modeling Competing Risk Data: [http://www.ctu.mrc.ac.uk/cascade/content\\_pages/documents\\_and\\_files/Comp\\_Risks\\_guide.pdf](http://www.ctu.mrc.ac.uk/cascade/content_pages/documents_and_files/Comp_Risks_guide.pdf)

BUGS Project homepage: <https://www.mrc-bsu.cam.ac.uk/software/bugs/>

Bolleyer, N., Correa, P., & Katz, G. (2018). Supplementary materials files for “Political party mortality in established party systems: A hierarchical competing risks approach”: <http://journals.sagepub.com/doi/suppl/10.1177/0010414018758764>

JAGS homepage: <http://mcmc-jags.sourceforge.net/>

Stan<sup>®</sup> homepage: <http://mc-stan.org/>

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